

Submit originals and one copy and electronic copy to Governance/Faculty Senate Office (email electronic copy to jbharvie@alaska.edu)

PROGRAM/DEGREE REQUIREMENT CHANGE (MAJOR)

SUBMITTED BY:

Department	Physics	College/School	CNSM
Prepared by	C. P. Price	Phone	x6106
Email Contact	cpprice@alaska.edu	Faculty Contact	C. P. Price

See <http://www.uaf.edu/uafgov/faculty-senate/curriculum/course-degree-procedures/> for a complete description of the rules governing curriculum & course changes.

PROGRAM IDENTIFICATION:

DEGREE PROGRAM	Physics
Degree Level: (i.e., Certificate, A.A., A.A.S., B.A., B.S., M.A., M.S., Ph.D.)	B.S.

A. CHANGE IN DEGREE REQUIREMENTS: (Brief statement of program/degree changes and objectives)

The Physics department is changing the one semester course PHYS 313 “Thermodynamics and Statistical Physics” (4 cr) to a two semester sequence of two 2-cr courses: “Thermal Physics” (PHYS 351, proposed, currently offered as the trial course PHYS 393) and “Statistical Physics” (PHYS 451, proposed, currently offered as the trial course PHYS 493.) This proposal is to change the degree requirements from PHYS 313 to PHYS 351 AND PHYS 451.

B. CURRENT REQUIREMENTS AS IT APPEARS IN THE CATALOG:

Major — B.S. Degree

- Complete the general university requirements. (See page 132. As part of the core curriculum requirements, these courses are suggested: CHEM F105X and CHEM F106X; GEOS F101X; BIOL F115X.)
- Complete the B.S. degree requirements (page 137).
- Complete the following program (major) requirements:

PHYS F211X—General Physics.....	4
PHYS F212X—General Physics.....	4
PHYS F213X—Elementary Modern Physics.....	4
PHYS F220—Introduction to Computational Physics.....	4
PHYS F301—Introduction to Mathematical Physics.....	4
PHYS F313—Thermodynamics and Statistical Physics.....	4
PHYS F341—Classical Physics I: Particle Mechanics.....	4
PHYS F342—Classical Physics II: Electricity and Magnetism.....	4
PHYS F343—Classical Physics III: Vibration and Waves.....	4
PHYS F381W,O—Physics Laboratory.....	3
PHYS F382W—Physics Laboratory.....	3
PHYS F421—Quantum Mechanics.....	4
PHYS F462—Geometrical and Physical Optics.....	4
PHYS F471—Advanced Topics in Physics I**.....	3
PHYS F472—Advanced Topics in Physics II**.....	3
- Complete the following program (major) requirements:

MATH F200X—Calculus I***.....	4
MATH F201X—Calculus II***.....	4
MATH F202X—Calculus III.....	4
MATH electives at the F300-level or above****.....	6
- Minimum credits required..... 120

*

Students must earn a C grade (2.0) or better in each course.**

Students must take at least three emphasis topics from F471 and at least three application topics from F472

*** Satisfies core curriculum or B.S. degree requirements, but not both.

**** Suggested electives: MATH F314, F421 and F422.

Note: Other courses suggested to fulfill minimum credit requirements: ES F201, F307 and F308.

C. PROPOSED REQUIREMENTS AS IT WILL APPEAR IN THE CATALOG WITH THESE CHANGES:
(Underline new wording ~~strike through old wording~~ and use complete catalog format)

Major – B.S. Degree

1. Complete the general university requirements. (See page 132.)

As part of the core curriculum requirements, these courses are suggested: CHEM F105X and CHEM F106X; GEOS F101X; BIOL F115X.)

2. Complete the B.S. degree requirements (page 137).

3. Complete the following program (major) requirements:*

PHYS F211X – General Physics..... 4

PHYS F212X – General Physics..... 4

PHYS F213X – Elementary Modern Physics..... 4

PHYS F220 – Introduction to Computational Physics..... 4

PHYS F301 – Introduction to Mathematical Physics..... 4

~~PHYS 313 – Thermodynamics and Statistical Physics.....4~~

PHYS 351 – Thermal Physics.....2

PHYS 451 – Statistical Physics.....2

PHYS F341 – Classical Physics I: Particle Mechanics..... 4

PHYS F342 – Classical Physics II: Electricity and Magnetism..... 4

PHYS F343 – Classical Physics III: Vibration and Waves..... 4

PHYS F381W,O – Physics Laboratory..... 3

PHYS F382W – Physics Laboratory..... 3

PHYS F421 – Quantum Mechanics..... 4

PHYS F462 – Geometrical and Physical Optics..... 4

PHYS F471 – Advanced Topics in Physics I**..... 3

PHYS F472 – Advanced Topics in Physics II**..... 3

4. Complete the following program (major) requirements:

MATH F200X – Calculus I***..... 4

MATH F201X – Calculus II***..... 4

MATH F202X – Calculus III..... 4

MATH electives at the F300-level or above****..... 6

5. Minimum credits required..... 120

*

Students must earn a C grade (2.0) or better in each course.**

Students must take at least three emphasis topics from F471 and at least three application topics from F472

*** Satisfies core curriculum or B.S. degree requirements, but not both.

**** Suggested electives: MATH F314, F421 and F422.

Note: Other courses suggested to fulfill minimum credit requirements: ES F201, F307 and F308.

D. ESTIMATED IMPACT

WHAT IMPACT, IF ANY, WILL THIS HAVE ON BUDGET, FACILITIES/SPACE, FACULTY, ETC.

Physics Department has offered PHYS 313 annually. It is now offering the two new courses annually. The total number of credits is unchanged, and there is thus no net impact on budget, facilities/space, faculty, etc..

E. IMPACTS ON PROGRAMS/DEPTS:

What programs/departments will be affected by this proposed action?

Include information on the Programs/Departments contacted (e.g., email, memo)

No departmental or programmatic impacts.

F. IF MAJOR CHANGE - ASSESSMENT OF THE PROGRAM:

Description of the student learning outcomes assessment process.)

Student learning outcomes for the BS Physics program is unaffected by this change; that process only indirectly utilizes the outcomes of this specific sub-topic of the field.

JUSTIFICATION FOR ACTION REQUESTED

The purpose of the department and campus-wide curriculum committees is to scrutinize program/degree change applications to make sure that the quality of UAF education is not lowered as a result of the proposed change. Please address this in your response. This section needs to be self-explanatory. If you drop a course, is it because the material is covered elsewhere? Use as much space as needed to fully justify the proposed change and explain what has been done to ensure that the quality of the program is not compromised as a result.

The Physics department is changing the one semester course PHYS 313 “Thermodynamics and Statistical Physics” (4 cr) to a two semester sequence of two 2-cr courses: “Thermal Physics” (PHYS 351, proposed, currently offered as the trial course PHYS 393) and “Statistical Physics” (PHYS 451, proposed, currently offered as the trial course PHYS 493.)

The curricular trend at peer and peer-aspirant institutions is to separate the two topics, as is proposed here and in the associated course proposal for PHYS 451 “Statistical Physics”, and to more explicitly place the resulting topical courses within the larger curriculum. We have found that students did not have adequate success in the predecessor course, PHYS 313, in part because that course did not have sufficient prerequisites, and in part because, as national results have shown, there is typically insufficient integration of the material in the topic of classical thermodynamics/thermal physics to immediately begin study in the topic of the statistical mechanics. The additional prerequisite requirements make students gain exposure to other topics in physics before tackling either set of topics (in classical thermodynamics; in statistical mechanics.) The separation also allows students to build more fully on the understanding of the topics in classical thermodynamics before attempting the statistical mechanics. The course changes are being proposed to raise the rate of student success in learning these topics. Otherwise, the curricular changes are transparent; exactly the same level and scope of topics have been carried forward from PHYS 313 to the sequence PHYS 351 + PHYS 451.

Since introducing the two trial courses last year, the department has been approving petitions from students to use those two courses to satisfy the degree requirement for PHYS 313. This proposal is to formally change the degree requirements from PHYS 313 to PHYS 351 and PHYS 451. Absent this change, eventually the department will be prevented from offering those trial courses and students will not be able to achieve all of the outcomes goals for the BS Physics program.

APPROVALS:

SEE ATTACHED SIGNATURES

	Date	
Signature, Chair, Program/Department of:		
	Date	
Signature, Chair, College/School Curriculum Council for:		
	Date	
Signature, Dean, College/School of:		

ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE

	Date	
Signature, Chair, UAF Faculty Senate Curriculum Review Committee		

JUSTIFICATION FOR ACTION REQUESTED

The purpose of the department and campus-wide curriculum committees is to scrutinize program/degree change applications to make sure that the quality of UAF education is not lowered as a result of the proposed change. Please address this in your response. This section needs to be self-explanatory. If you drop a course, is it because the material is covered elsewhere? Use as much space as needed to fully justify the proposed change and explain what has been done to ensure that the quality of the program is not compromised as a result.


The Physics department is changing the one semester course PHYS 313 "Thermodynamics and Statistical Physics" (4 cr) to a two semester sequence of two 2-cr courses: "Thermal Physics" (PHYS 351, proposed, currently offered as the trial course PHYS 393) and "Statistical Physics" (PHYS 451, proposed, currently offered as the trial course PHYS 493.)

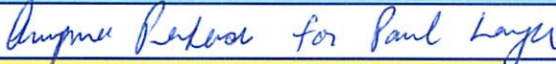
The curricular trend at peer and peer-aspirant institutions is to separate the two topics, as motivated by the finding (here and elsewhere) that student learning of the material is improved; in part, doing so allows students to gain exposure to other topics in physics before tackling topics in statistical mechanics, and doing so also allows them to build more fully on the understanding of the topics in classical thermodynamics. The curricular changes are transparent; exactly the same level and scope of topics have been carried forward from PHYS 313 to the sequence PHYS 351 + PHYS 451.

Since introducing the two trial courses last year, the department has been approving petitions from students to use those two courses to satisfy the degree requirement for PHYS 313. This proposal is to formally change the degree requirements from PHYS 313 to PHYS 351 and PHYS 451.

APPROVALS:

	Date	12 SEP 2013
Signature, Chair, Program/Department of:		

	Date	9-23-13
Signature, Chair, College/School Curriculum Council for: CNSM		

	Date	9-24-2013
Signature, Dean, College/School of:		

ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE

	Date	
Signature, Chair, UAF Faculty Senate Curriculum Review Committee		